

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 51-54, 57, 58, 60, 61, 63-65, 67, 68, 70-72, and 75 are rejected under 35

U.S.C. 102(b) as being anticipated by Kimura (5,224,714).

Kimura discloses an apparatus having a first portion 3 with a frusto-conical surface 31, a second portion 4 with a flat surface and a biasing device 10. The apparatus operates in a non-contact mode with gas between the faces, but the surfaces are in contact when the portions are at rest. The second portion includes an axially moveable tile carrier 5 with a tile element 4 defining the flat surface. The second sealing surface is located within a housing 6 having a ring (leg portion near line 2rb) on which the surface slides (forms the radial sealing surface). The apparatus has diverging gaps on either side of the closest point of engagement of the faces because of at least surface 31 and grooves 33. And, since the surfaces 31 and 33 have a circumferential dimension (e.g. see Fig. 2), the gaps extend circumferentially.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 51-58, 60, 61, 63-72, 75 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura in view of Ide (4,738,453).

Kimura discloses an apparatus having a first portion 3 with a frusto-conical surface 31, a second portion 4 with a flat surface and a biasing device 10. The apparatus operates in a non-contact mode with gas between the faces, but the surfaces are in contact when the portions are at rest. The second portion includes an axially moveable tile carrier 5 with a tile element 4 defining the flat surface. The second sealing surface is located within a housing 6 having a ring (leg portion near line 2rb) on which the surface slides (forms the radial sealing surface). Kimura does not disclose plural pivotably mounted tiles. Ide teaches a non-contact sealing apparatus having a first portion biased toward a second portion. Ide teaches using lift pads/tiles 40 having flat surfaces and biasing devices 42. Ide teaches that the use of the pads helps control the fluid film, and thus the seal, between the faces. Ide also teaches that this arrangement is less affected by contaminants. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the flat face of Kimura with the pad/tiles taught by Ide to improve the sealing function of the apparatus. This configuration would provide the diverging gaps on either side of the closest point between the faces. And, since the surfaces 31 and 33 have a circumferential dimension (e.g. see Fig. 2), the gaps extend circumferentially.

Regarding claim 76, Kimura's prior art shows the faces without grooves.

5. Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura in view of Ide and further in view of Gardner

Gardner teaches the use of additional seal on the opposite side of the rotor to create a bi-directional seal that functions regardless of shaft rotation direction. It would have been obvious

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to modify the first portion with an additional frusto-conical surface and mating ring as taught by Gardner to ensure a seal regardless of shaft rotation direction.

6. Claims 59, 73 and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura in view of Ide as applied to claims 51 and 69 and further in view of Gardner.

Kimura does not appear to disclose a coating on the surfaces. Gardner teaches using a coating to provide lubrication in dry gas environments. However, Gardner does not state the coating is abradable. The selection of a known material based on its suitability for its intended use is considered obvious. See *In re Leshin*, 125 USPQ 416 (CCPA 1960). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an abradable coating to provide lubrication in certain environments.

7. Claim 66 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura.

Kimura discloses coil springs as the biasing device. The examiner takes official notice that a wave spring is an equivalent biasing device to a coil spring. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus by using a wave spring instead of coil springs.

### ***Response to Arguments***

8. Applicant's arguments filed 8-13-08 have been fully considered but they are not persuasive.

As stated above, the surfaces have a circumferential dimension, thus the gaps extend circumferentially. It appears Applicant might be arguing a feature that is not adequately claimed by the current limitations. Regarding claim 75, the seal is a non-contact seal. Thus the faces are held apart as required. Applicant argues the combination of Kimura and Ide as being unobvious.

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The examiner disagrees. Ide teaches an improved configuration that helps control fluid film. And, at the very least, Ide teaches an alternate means of achieving an expected result and thus would be obvious. Also, Ide is also a non-contact seal. There would be a film between the face of the pads 50 and the opposed face 20. It appears the combination of Ide and Kimura would result in a similar configuration to Applicants' and thus should function the same.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alison K. Pickard whose telephone number is 571-272-7062. The examiner can normally be reached on M-F (9-5).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Gay can be reached on 571-272-7029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alison K. Pickard/  
Primary Examiner, Art Unit 3676